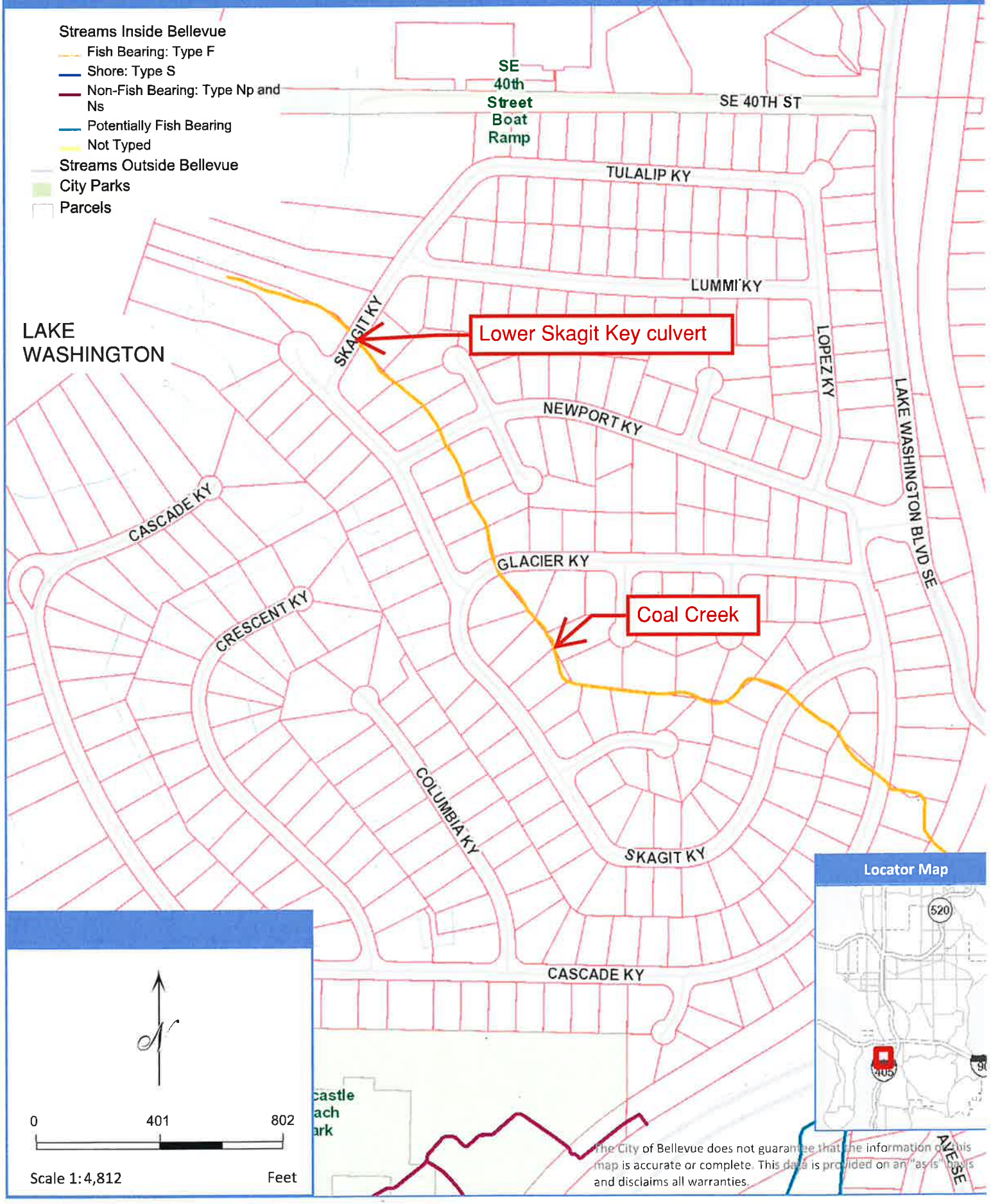
VICINITY MAP



The City of Bellevue does not guarantee that the information on this map is accurate or complete. This data is provided on an "as is" basis and disclaims all warranties.

Map Generated on: 09/26/2018

City of Bellevue

MEMORANDUM

To: DSD Permit Review

From: Debbie Harris

cc:

Date: 10/20/16

Re: Lower Coal Creek Flood Hazard Reduction Project – Project Narrative

From the Project SEPA Checklist (A.11)

Over the last two decades, the City of Bellevue (City) has responded to numerous complaints of flooding in the Coal Creek watershed associated with a range of causes, including backed-up storm drains, blocked culverts, and channel overflows. The City seeks to implement flood hazard reduction measures that would abate existing flooding problems and convey flows equivalent to the 100-year flood event. To accomplish this, the City would replace existing drainage utilities with new structures sized to reduce flooding.

The Lower Coal Creek Flood Hazard Reduction Project would replace five culverts in the Newport Shores neighborhood with five new single-span bridge structures that meet current design guidelines for fish passage, flood conveyance, debris passage, and traffic safety. Preliminary engineering and design have been developed for replacement structures where Coal Creek is crossed by the following roadways: Cascade Key, upper Skagit Key, Glacier Key, Newport Key, and lower Skagit Key (Figure 1).

Each proposed bridge structure would have at least a 24-foot span and would consist of four drilled shafts (one at each corner of the bridge), a cap beam between the shafts parallel to the stream, and a concrete slab deck. The deck slab may be either pre-cast or cast in place. Existing City-owned and franchise utilities that are in conflict with the proposed new structures would be relocated within the existing rights of way.

The new bridge structures would simulate the natural stream dimensions, allowing sediment and debris to pass through and providing fish unhindered passage beneath the roadway. The new structures would be designed to comply with the updated State Hydraulic Code. The proposed culvert replacement structures were sized according to the Stream Simulation method outlined in Chapter 3 of WDFW's Water Crossing Design Guidelines (Barnard et al. 2013), using the Stream Simulation option. Section 2.3 of the technical memorandum, Bankfull Width Determination for Lower Coal Creek Culvert Design (prepared by NHC, 2016, and appended to the Preliminary Design Report), references the use of Equation 3.2 from the Water Crossing Design Guidelines to determine the size of the replacement structures. This equation is used to develop the structure width based on the stream simulation methodology and states that the bed width through the structure should be 20% larger than the channel bankfull width plus an additional 2 feet.

NHC measured channel bankfull width at each of the culvert crossings using the methodology outlined in Appendix C of the Water Crossing Design Guidelines. Their field investigation found

that the existing culverts are 10 feet wide at the three upstream crossings and 13.5 feet wide at the two downstream crossings and that the average bankfull width in the study reaches ranges from 15 to 17 feet. Applying Equation 3.2 from the Water Crossing Design Guidelines yields a channel width of 20 to 22.4 feet through the proposed structures. To be conservative, structures installed at all crossings would be at least 24 feet wide. The design of the new structures would also comply with the National Marine Fisheries Service's (NMFS') facility design criteria and guidelines for anadromous salmonid passage (NMFS 2011), as well as applicable standards pertaining to the provision of freeboard. To meet freeboard criteria, the existing roadways at upper Skagit Key, Glacier Key, and Newport Key would be raised up to 1.5 feet and would operate with at least 1 foot of freeboard up to the 100-year flood event.

The channel through each bridge structure would be designed so that the shape of the cross-section and gradient matches the existing stream channel configuration of the reach near the structure. The channel would be constructed with a gravel and cobble material that matches the stream substrate in the adjacent reach. Bands of larger cobble and rock material would be installed in the channel inside of the bridge and at the upstream and downstream faces of the bridge structures to provide for substrate stability and to control scour and reduce the potential for head cutting upstream of the structures. The design of the sediment bands would be based on the existing sediment characteristics and proposed hydraulic conditions in the stream and would be consistent with the stream simulation design method.

Installation of large wood would occur along Coal Creek at various locations within the project area to protect against erosion at bridge openings and to locally stabilize stream banks. Large wood would also be installed to provide habitat enhancement to replace the future potential habitat function of existing mature trees that would need to be removed for bridge construction. No large wood would be installed at the outfall locations or within Lake Washington. The number of wood pieces included as mitigation for this project was based on the number of trees to be removed during construction.

Surface water flow in Coal Creek would be temporarily bypassed within a pipe through the work area at each bridge site to protect water quality during construction (see Section B.3.4 for a more detailed description). The bypass pipe would be sized to adequately pass normal stream flows expected to occur during the summer in-water construction windows.

The roadway within the affected area of each new bridge structure would be reconstructed to meet current roadway standards related to travel lanes, parking lanes, curbs, sidewalks, clear zone, and stormwater facilities. Areas along stream banks disturbed by construction activities would be stabilized during construction to avoid erosion and restored with native vegetation. Areas that are maintained lawn and other landscaped areas that would be disturbed during construction would be restored to a condition similar to the preconstruction condition. All excavated material and excess construction material would be removed from the work areas at the completion of each project element and reused or disposed of at a facility licensed to accept the material. No excess material would be disposed of on site.

In addition to the flooding problems caused by the existing culverts, roadway storm drainage capacity in the Newport Shores neighborhood is limited by backwater conditions during periods of high flows in Coal Creek and stream sediment that created a blockage of existing stormwater outfalls that currently discharge directly the stream. To address backwater problems and reduce

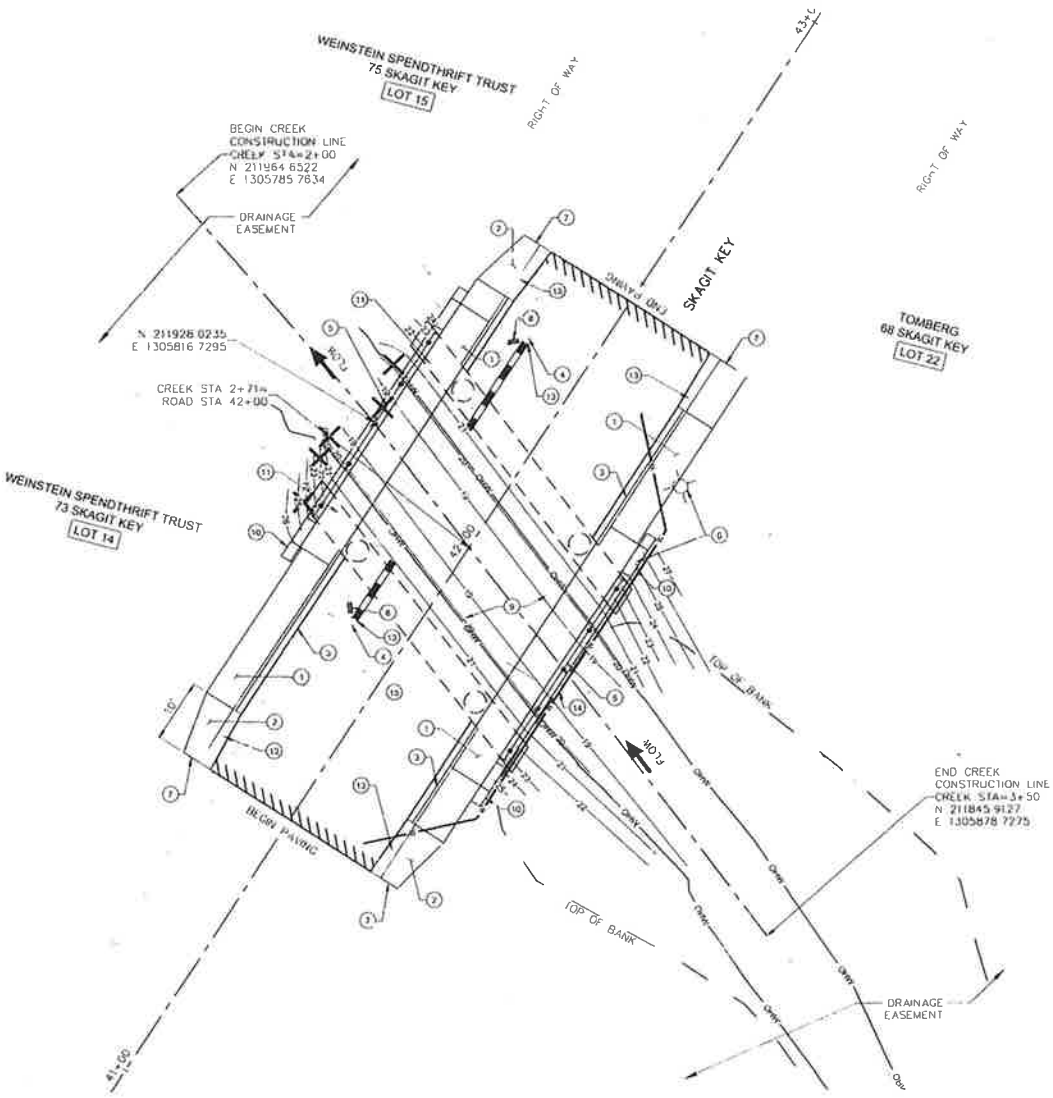
localized flooding, the storm drain outfalls at Glacier Key, Newport Key, and lower Skagit Key would be rerouted to discharge directly to Lake Washington at one of two new outfalls.

Stormwater that currently discharges directly to Coal Creek would be directed to a network of new and replaced stormwater conveyance piping constructed within the existing road network and right-of-way until the pipelines meet private property near the shoreline. At this point the new conveyance piping would cross private property to the outfall locations. The precise locations of the new outfalls have not yet been determined. The City would obtain property rights to allow construction on private property. The conveyance system would be installed using standard construction methods—primarily trenching, except where physical constraints (e.g., proximity to houses) necessitate trenchless installation if technically feasible. Construction of the new outfalls and conveyance may not be completed until some or all of the new bridges are completed. During construction of the new bridge structures the City would make provisions to accommodate the new stormwater system. Existing stormwater outfalls to Coal Creek would be maintained and would remain in use until such a time as the new outfalls and conveyance system are constructed.

The project would comply with the best management practices outlined in the Washington State Department of Ecology's 2012 Stormwater Management Manual. The project would also comply with current City of Bellevue Surface Water Engineering Standards.

CONSTRUCTION NOTES:

1. CEMENT CONCRETE SIDEWALK, SEE X/Y
2. TAPER CEMENT CONCRETE SIDEWALK TO MATCH EXISTING, TYP
3. TRAFFIC CURB AND GUTTER, SEE X/Y
4. ADJUST CATCH BASIN TO GRADE
5. BRIDGE RAIL WITH MIN TL-1 RATING, SEE SHEET X
6. RELOCATE LIGHT POLE
7. SAWCUT SIDEWALK, CURB, AND GUTTER
8. PLUG EXISTING STORM
9. REMOVE EXISTING CULVERT, WINGWALLS AND HEADWALLS
10. SEE X/Y FOR TERMINAL AND WINGWALL DETAILS
11. REMOVE STORM DRAIN IN CONFLICT WITH CONSTRUCTION
12. CONNECT TO DRAINAGE STRUCTURE
13. TRANSITION ROLLED TO TRAFFIC CURB AND GUTTER, SEE X/Y
14. RELOCATED WATER PIPE MOUNTED ON BRIDGE, SEE X/Y
15. SEE SHEET x FOR TYPICAL ROAD CROSS SECTION



IMPERVIOUS AREA = 4,521 SF

NAVD 88

0 5 10 15 20
SCALE IN FEET

SITE PLAN B
PERMIT SUBMITTAL

NO	DATE	BY	APPR	REVISIONS

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www.tetratech.com
1420 Fifth Avenue, Suite 650
Seattle, Washington 98101
Phone 206-728 9655 Fax 206 883 9301

Approved By

DESIGN MANAGER DATE

PROJECT MANAGER DATE

IP DESIGNED BY DATE
BJ DRAWN BY DATE
JS CHECKED BY DATE

City of Bellevue
UTILITIES

LOWER SKAGIT KEY
CREEK AND ROAD PLAN

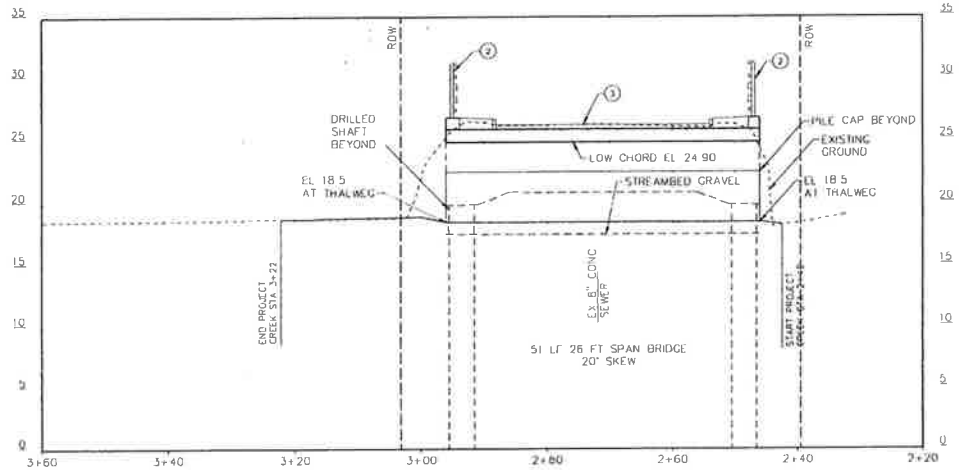
S-C1 SHT ___ OF ___

CONSTRUCTION NOTES:

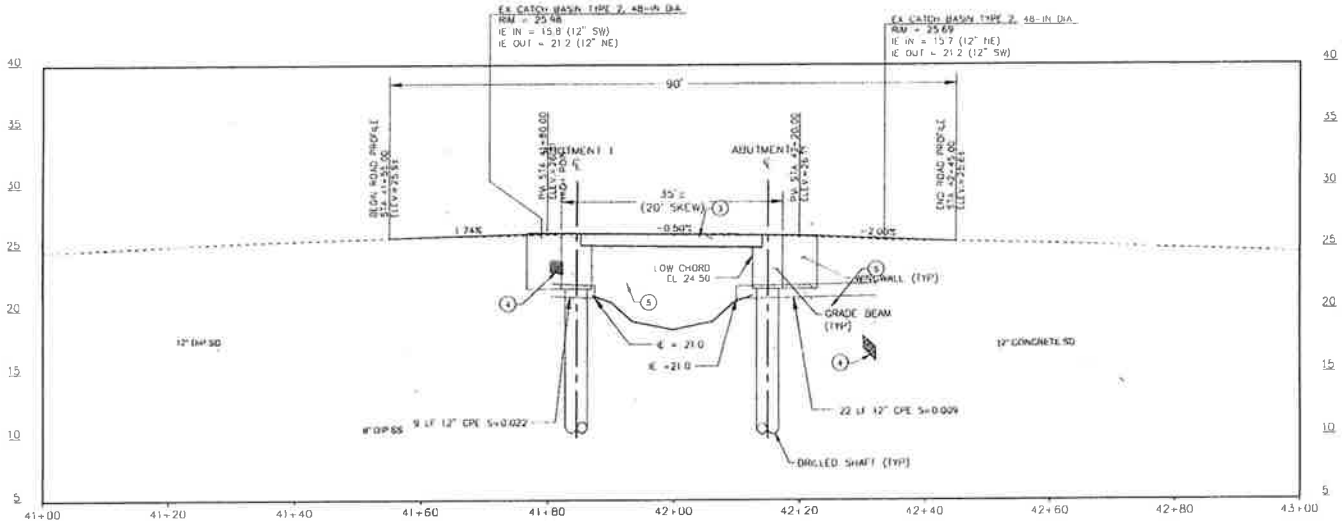
1. NOT USED
2. BRIDGE RAIL WITH MIN TL-1 RATING, SEE SHEET X
3. SEE SHEET X FOR TYPICAL ROAD CROSS SECTION
4. PLUG EXISTING STORM DRAIN
5. BURIED/PLUGGED EXISTING STORM DRAIN

NOTE:

SEE SHEET X FOR UTILITY AND ROAD RELATED IMPROVEMENTS



CREEK PROFILE CENTERLINE AT LOWER SKAGIT KEY
SCALE: HORIZ: 1"= 10' VERT: 1"=5'



ROAD PROFILE SKAGIT KEY-LOWER CENTERLINE
SCALE: HORIZ: 1"= 10' VERT: 1"=5'

NAVD 88

0 5 10 15 20
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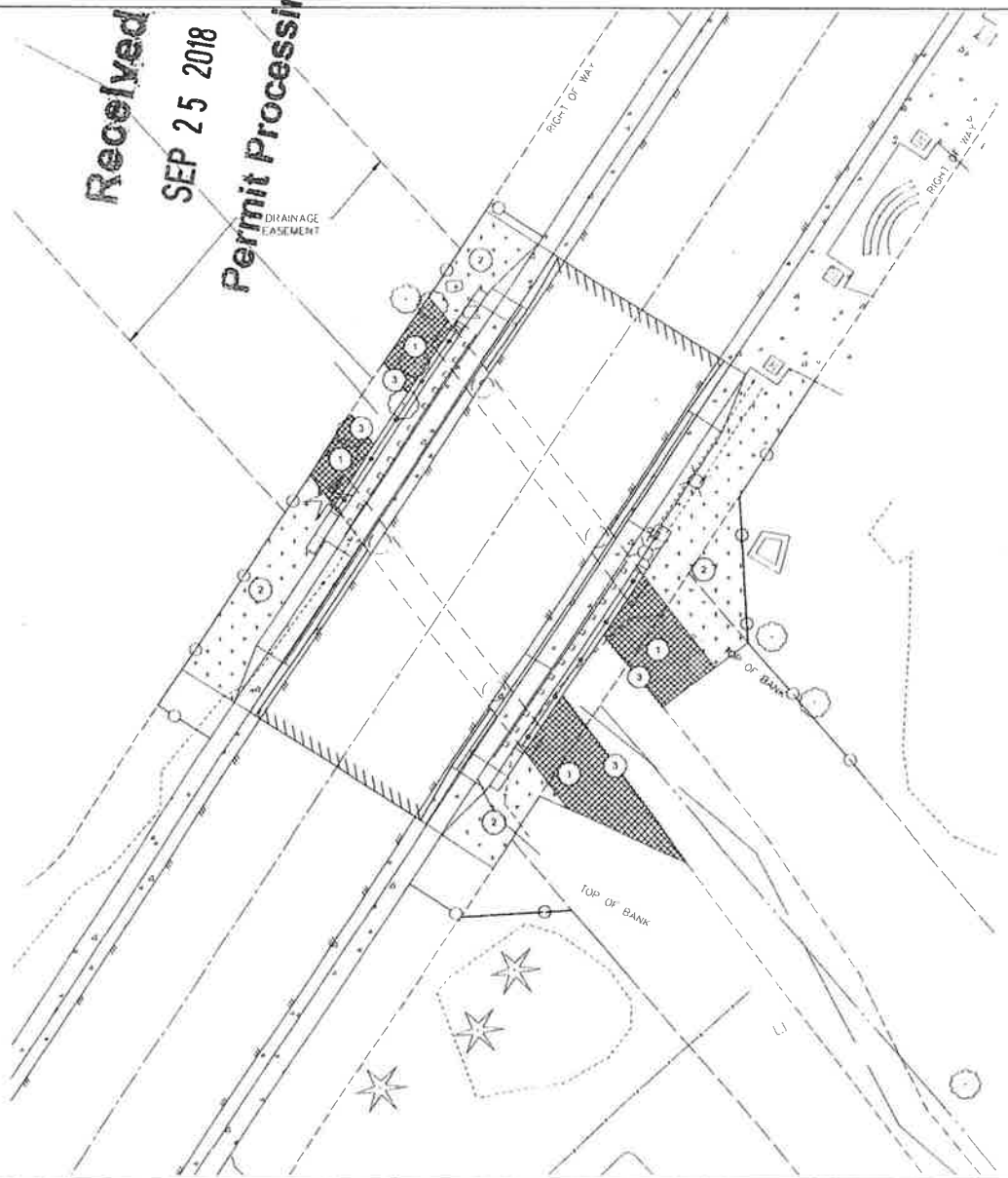
City of Bellevue
UTILITIES

LOWER SKAGIT KEY
ROAD PROFILE

S-C2 SHT ____ OF ____



PLANTING LEGEND AND MATERIALS LIST:

	SCIENTIFIC NAME	COMMON NAME	QTY	MIN SIZE / CONDITION	SPACING	NOTES
	TREES					
	ACER CIRCINATUM	VINE MAPLE	x	3/4" CAL / #5 CONT	Per Plan	SEE DETAIL 4/C-L2
	ACER MACROPHYLLUM	BIG LEAF MAPLE	x	3/4" CAL / #5 CONT	Per Plan	
	CORYLUS CORNUTA	BEAKED HAZELNUT	x	3/4" CAL / #5 CONT	Per Plan	
	PSEUDOTSUGA MENZIESII	DOUGLAS-FIR	x	4' TALL / #5 CONT	Per Plan	
	THUJA PLICATA	WESTERN RED CEDAR	x	4' TALL / #5 CONT	Per Plan	
	ZONE 1 PLANTINGS					
	CORNUS SERICEA	RED OSIER DOGWOOD	99	30" x 1/2" / LIVESTAKE	18" OC	SEE DETAIL 1/C-L2
	SALIX HOOKERIANA	HOOKER'S WILLOW	99	30" x 1/2" / LIVESTAKE	18" OC	
	SALIX SITCHENSIS	SITKA WILLOW	99	30" x 1/2" / LIVESTAKE	18" OC	
	ZONE 2 PLANTINGS					
	CORNUS SERICEA	RED OSIER DOGWOOD	24	12" / #1 CONT	3' OC	SEE DETAIL 2/C-L2
	HOLODISCUS DISCOLOR	OCEANSPRAY	11	12" / #1 CONT	3' OC	
	PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	11	12" / #1 CONT	3' OC	
	ROSA PISOCARPA	CLUSTERED WILD ROSE	24	12" / #1 CONT	3' OC	
	RUBUS SPECTABILIS	SALMONBERRY	24	12" / #1 CONT	3' OC	
	SYMPHORICARPOS ALBUS	SNOWBERRY	24	12" / #1 CONT	3' OC	
	GAULTHERIA SHALLON	SALAL	11	12" / #1 CONT	3' OC	
	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	11	24" / #2 CONT	3' OC	
	COIR LOG PLANTINGS					
	SALIX SITCHENSIS	SITKA WILLOW	28	30" x 1/2" / LIVESTAKE	1' OC	SEE DETAIL 3/C-L2
	CORNUS SERICEA	RED OSIER DOGWOOD	28	30" x 1/2" / LIVESTAKE	1' OC	
	SALIX HOOKERIANA	HOOKER'S WILLOW	28	30" x 1/2" / LIVESTAKE	1' OC	

NAVD 88

0 5 10 15 20
SCALE IN FEET

CONSTRUCTION NOTES:

1. ZONE 1 RIPARIAN RESTORATION, SEE DETAIL 1/C-L2
2. ZONE 2 RIPARIAN RESTORATION, SEE DETAIL 2/C-L2
3. COIR LOG PLANTING, SEE DETAIL 3/C-L2
4. ADJUST PLANT INSTALLATION AROUND RETAINED TREES
5. LAWN RESTORATION, SEE DETAIL 6/C-L2

GENERAL NOTES

1. LOCATE AND PROTECT EXISTING LANDSCAPE IRRIGATION, REPAIR OR REPLACE IF DAMAGED

PERMIT SUBMITTAL

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PROJECT MANAGER DATE

JC	08/17/18
DESIGNED BY	DATE
JC	08/17/18
DRAWN BY	DATE
JM	08/17/18
CHECKED BY	DATE

City of Bellevue
UTILITIES

LOWER SKAGIT KEY RIPARIAN RESTORATION PLAN

S-L1 | SHT xx OF 41